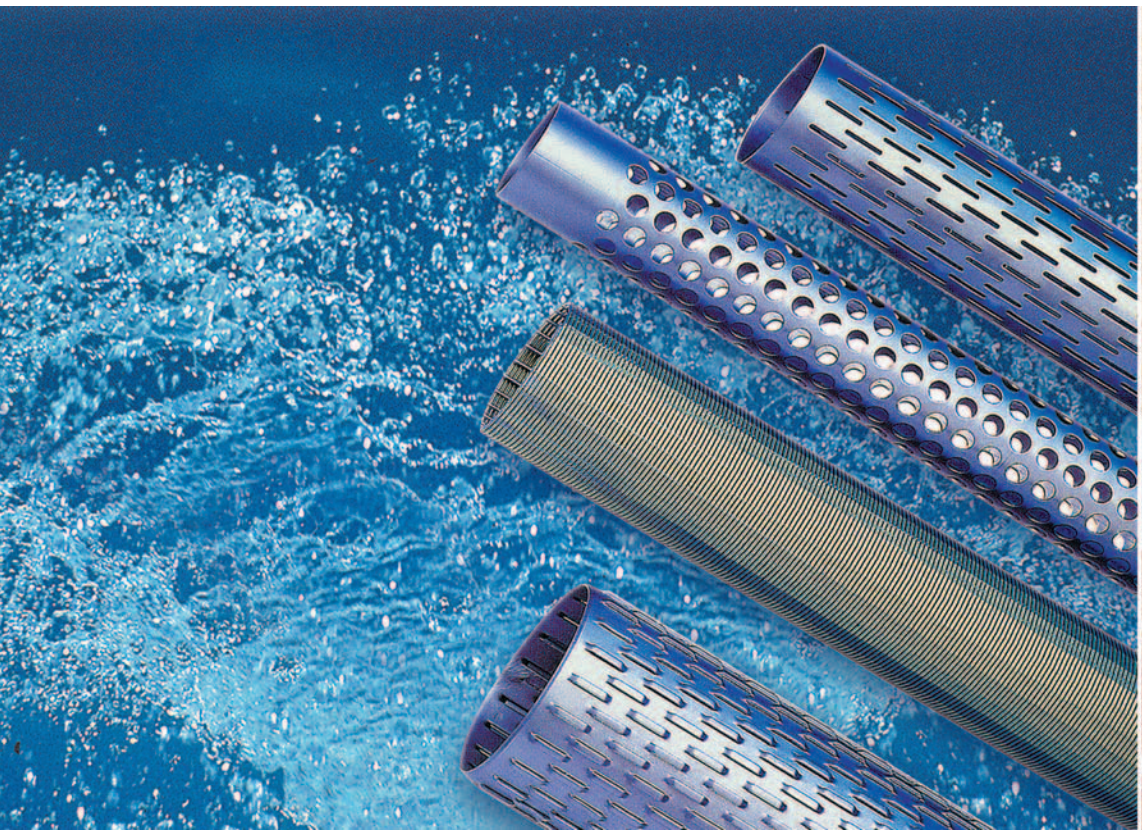
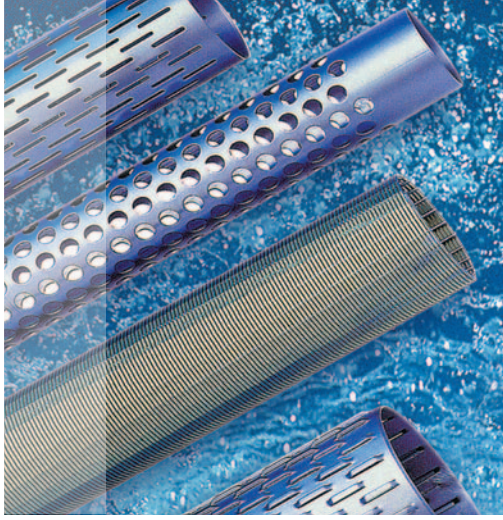
WATER WELL
Looking Beyond Tomorrow



Johnson screens®

JOHNSON SCREENS®



WHEN PERFORMANCE IS IMPORTANT – THERE IS NO EQUAL

Johnson Screens has a high reputation among drilling professionals and those involved in the water well industry. Johnson's range of quality products results from years of experience working in the groundwater industry. The variety of products available, e.g, Continuous slot, Bridge-slot, rectangular or round-hole screens, means that the optimum solution is always available, no matter how difficult the situation. The use of our screens ensures that optimum well completion is achieved.

THE INDUSTRY'S BEST PRODUCT LINE GETS THE INDUSTRY'S BEST SUPPORT

At *Johnson Screens* we do more than make the world's best well screens. We also supply you with technical support that's like having your own in-house engineering team. Whether you need sand analysis of your formation materials, screen size recommendation, screen installation suggestions or want to discuss any aspect of well construction, contact us. Our support staff includes design engineers, chemists, metallurgists, technical support personnel and sales engineers who have been on the shop floor, taught in classrooms and technical seminars, set and pulled screens and run pumping tests. We speak your language, understand your problems, and are here to help.

PRODUCTION - ENABLING TECHNOLOGIES THAT CONVERT RESERVES INTO REVENUES

Johnson Screens® ongoing technology focus continues to provide the right technologies for every application in the most cost-effective manner for our clients. Key criteria for technology development include products that

- Drive down well costs
- Increase well productivity
- Address the technical challenges of new wells

Screens are shipped globally from any of our manufacturing facilities.

MANUFACTURING INFRASTRUCTURE

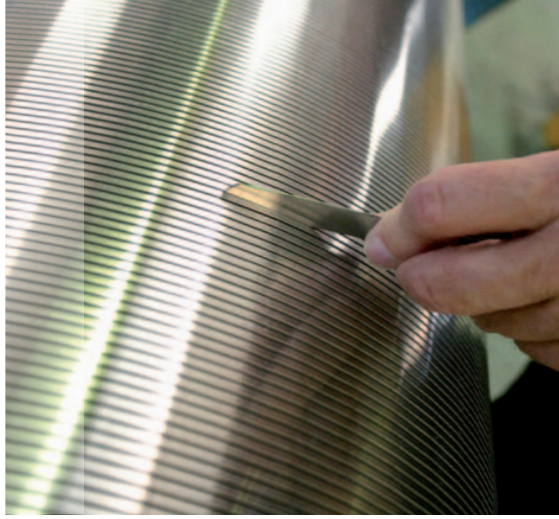
Johnson Screens certified manufacturing facilities are strategically located around the globe.

Over the last 5 years we have doubled our manufacturing capacity by adding new equipment, expanding factories and investing significantly in our screen fabrication and wire production facilities.

We put all of our manufacturing employees through intense internal and external training programs to ensure the highest level of quality control.

With 100-plus years of experience in driving water well screen technology and with global ISO 9001 manufacturing facilities in Australia, France, India, Japan, Chile, Argentina & the United States, Johnson Screens greater economies of scale provide real bottom-line value.

JOHNSON SCREENS®
WATER WELL SCREENS



Drilling technology has undergone many changes over the years. Operators continue to drill deeper and into more difficult formations. The technological expertise available for well completion has advanced dramatically in complexity and effectiveness.

We know, *Johnson Screens* has been there since the beginning. We pioneered many of the advances in sand control technology and currently hold some of the most important patents in the field.

In some of the deepest wells, under the most difficult downhole conditions as well as in thousands of water wells, *Johnson Screens* products have proved themselves again and again.

We have always recognized that our water well screen technology represents the single most important factor affecting the efficiency of a production well.

Consequently, we operate the most complete well screen manufacturing facilities in the industry. To ensure the precision and quality of our products, we control every step of their production.

Each order starts with custom materials to meet well-specific operating conditions. We draw, anneal and roll-form our own Vee-wire® (wedge-wire) to exact dimensions. Screen-fabricating machines weld and assemble each screen, with careful quality checks at every stage.

These unmatched standards of excellence have fueled our growth in this critical industry. Our global footprint reduces lead time and transport costs to your well site wherever it may be.

SAND SCREENING

SAND CONTROL HAS ALWAYS BEEN ONE OF THE MOST CRITICAL CHALLENGES IN WELL COMPLETION.

Economic considerations, such as the increased costs of remedial work, have moved sand control to a central position in well management.

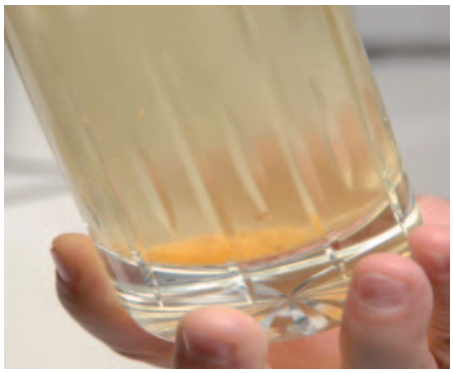
Production reliability and productivity is essential and important.

The physical mechanisms that result in sand production in water well screens are very complex.

Producing sand can result in premature failure of submersible pump equipment. Sand bridges formed in the casing or tubing can impede and eventually obstruct the flow of your well. The compaction or erosion of surrounding formations can cause failure of casings and liners.

A screen failure in the producing zone can mean the loss of your well. Other sand-related challenges include abrasion of downhole and surface equipment and difficulties associated with handling and disposing of produced formation sands.

SAND CONTROL TECHNOLOGY



Through these developments, the water well screen has been a key component of sand-control systems, either as an integral component of the gravel pack, or as a stand-alone provider of sand control. The Vee-Wire®, welded construction and self-cleaning designs are standard elements of our water well screens.

SCREEN SELECTION

Screen design is, without question, a critical factor in designing an efficient well. The well should be designed to serve two basic purposes: allow access to the formation for development purposes and permit unobstructed entry of water into the well.

To serve this purpose the screen should have

- The largest possible open area consistent with strength requirements.
- Openings should be uniformly arranged so that the water flowing from the formation can enter the screen directly.
- A design that allows the entire formation to be reached during development.

Louver or bridge slot screens have more open area than a perforated pipe. However, the slot configuration diverts flow of incoming water, increasing head loss through the screen and restricting development of the formation.

Continuous slot, Vee-Wire® screens permit water to enter along the entire screen and allow maximum access to the water bearing strata, allowing proper development to take place.

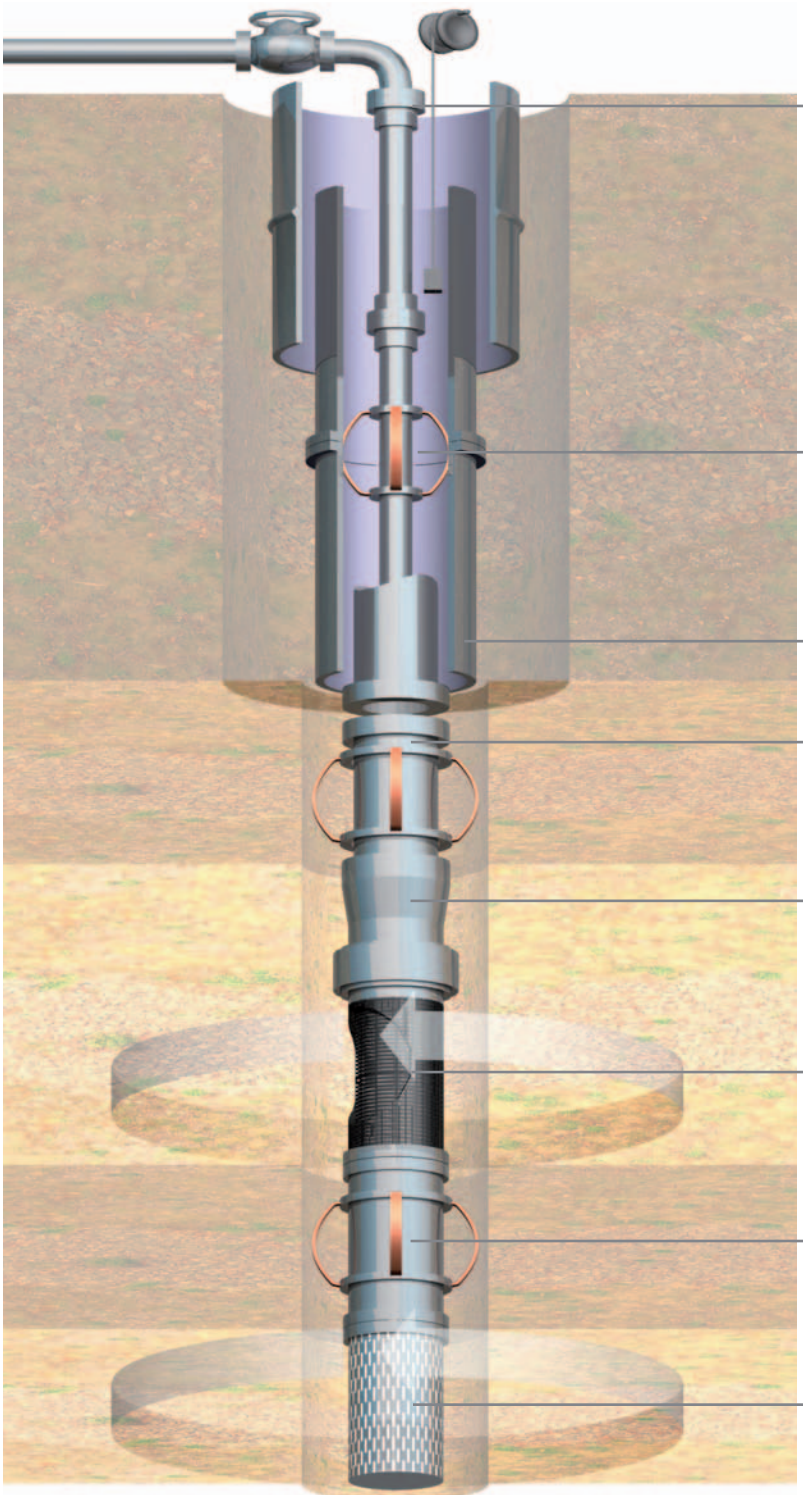
The benefits from this screen design are

Lower pumping costs:
Johnson's screens have more open area than other screen types, which lets more water enter more easily. This creates less drawdown inside the well reducing the energy demand on the pump.

Less pump wear:
Properly designed screens prevent sand from entering the well, preventing abrasion of pump impellors. The low entrance velocity also reduces sand pumping and head loss.

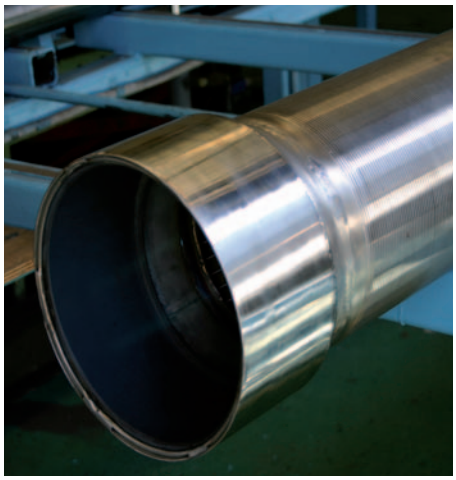
Longer well life:
Because water enters the well easily, it can move at a low velocity - 0.3 m/second or less (0.1 ft/s). Higher velocities create higher pressure drop or head loss, allowing gases to pass out of the solution, leading to encrustation of the screen surface.

OUR PRODUCTS



WIRE WRAPPED SCREENS

CONTINUOUS-SLOT VEE-WIRE® SCREENS



Johnson Screens® developed the all-welded, continuous-slot screen and after more than 100 years of designing and building these custom screens for the most demanding applications, we are truly the world's most experienced provider.

Precise slot control begins with precise wire forming; therefore we draw, form and anneal our own wire to ensure that it meets our exact standards.

These practices become especially critical with our precise, slot-tolerant, high open-area designs. So whether your application requires minimal drawdown pressures or industry-leading mechanical strength, turn to *Johnson Screens*.

Due to its high open area, our screens can be developed more effectively as more of the development energy can reach the formation. This ensures that more fine material is removed quickly as all the energy can be directed at the surrounding formation.

The continuous-slot Vee-Wire® screen is recommended in the following situations;

- Formation comprised of small or fine particles
- Water wells where gravel packs will be installed
- Thin aquifers, where maximum open area is required
- Small diameter wells

MAXIMIZING FLOW RATES

When considering screens of equal length, diameter and slot size, flow rates through *Vee-Wire* screens can be;

- Three times higher than bridge-slot screens
- Nine times higher than slotted casing

NON-CLOGGING SLOT

Johnson's *Vee-Wire* is designed to provide unique structural strength. The "V" shaped openings allow only two contact points, thus preventing clogging and making cleaning easier.

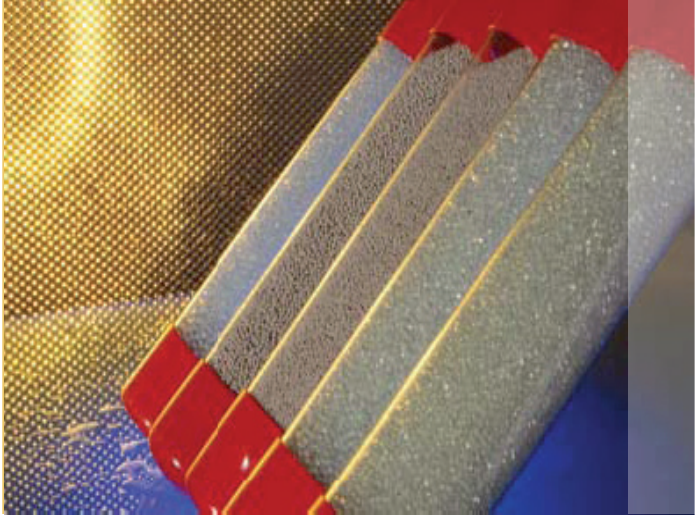
SLOT SIZES

- Between 0.006 In. - 0.250 In. (0.1 - 6 mm
- Materials of construction
- Stainless steel types 304, 304L, 316, 316L, 904, 904L, J29 and galvanized steel and other corrosion-resistant alloys are available for adverse conditions.

REDUCTIONS IN OPERATING COSTS

By using a Johnson screen, savings can be achieved in pumping costs. Lower through-slot velocities mean that pressure drops are minimized, therefore;

- Drawdowns are reduced.
- Less energy is needed for pumping.
- Flow rates are increased.
- Less sand in the water reduces wear on the pumps.

PRE-PACKED SCREENS

MUNI-PAK™ SCREENS

Johnson's solution to improve the gravel pack is the *Muni-Pak*. It simplifies the contractor's work, improves the odds for successful development and offers long-term benefits for the owner.

The *Muni-Pak* is the state-of-the-art technology for pre-packed screens. For the contractor, the pre-packed screen eliminates the need for a larger borehole. It shortens the amount of time required to drill a well, and speeds development time. *Muni-Pak*, uses ceramic beads as the filter media.

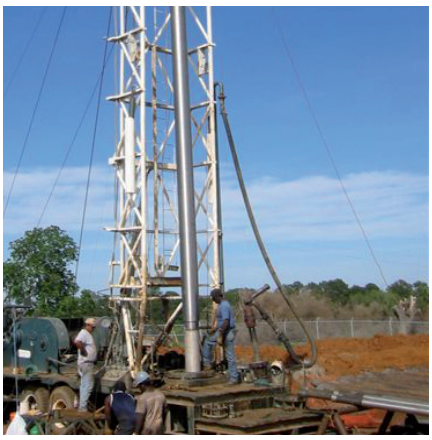
This unique concept provides a filter pack that is less likely to get fouled with biofilm and encrustation.

Muni-Pak lowers overall maintenance costs for the owner.

Benefits of the *Muni-Pak* screen are;

- Smaller borehole
- No gravel placement
- Increased strength
- Thinner filter pack

Final assembly of the Muni-Pak

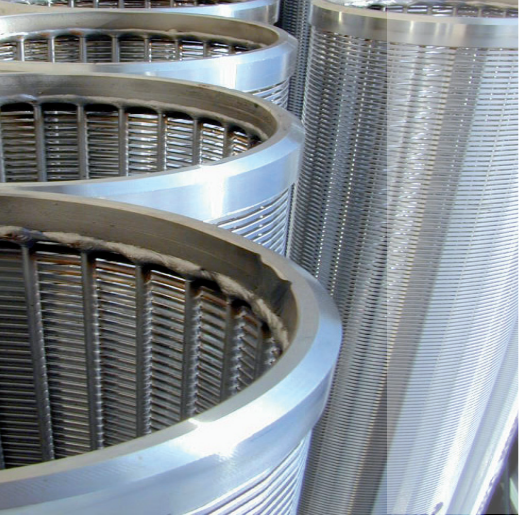


Installation of the Muni-Pak

PIPE-BASED SCREENS

Pipe-based water well screens combine the hydraulic efficiency of wire-wound screens with the great strength of pipe. Because of the strength of the pipe liner, the wrap wires can be smaller, which produces greater open area.

The longitudinal support rods on the screen jacket create channels which direct incoming flow to the nearest pipe perforation. Screen and pipe are welded to make a rugged, reliable unit suitable for deep wells.



STANDARD SCREEN

For shallow and medium-depth wells. High flow rates due to large open area.

Nominal Diam. in.	ID In. (mm)	OD In. (mm)	Wt. lbs/ft (Kg/m) Shallow
2	2.0 (50)	2.4 (60)	2.3 (3.4)
3 1/2	3.1 (78)	3.5 (89)	2.8 (4.2)
4	3.5 (88)	4.0 (102)	3.1 (4.6)
4 1/2	4.0 (101)	4.5 (114)	3.7 (5.5)
5	4.5 (114)	5.0 (127)	4.0 (6.0)
5 1/2	5.0 (127)	5.5 (140)	4.5 (6.7)
6 5/8	6.1 (156)	6.6 (168)	5.0 (7.5)
7	6.5 (164)	7.0 (178)	6.7 (10.0)
7 5/8	7.0 (177)	7.6 (194)	7.4 (11.0)
8 5/8	8.1 (205)	8.6 (219)	8.3 (12.3)
9 5/8	9.1 (230)	9.6 (245)	9.4 (14)
10 3/4	10.1 (256)	10.8 (273)	11.5 (17.1)
12	12.0 (305)	12.8 (324)	14.5 (21.6)
14	13.2 (336)	14.0 (356)	15.7 (23.4)
16	15.2 (387)	16.0 (406)	20.0 (29.8)
18	17.2 (436)	18.0 (457)	25.7 (38.3)
20	19.1 (484)	20.0 (508)	28.9 (43.0)
24	23.0 (585)	24.0 (610)	39.9 (59.4)
30	28.7 (730)	30.0 (762)	49.1 (73)
32	30.7 (780)	32.0 (812)	53.1 (79.0)

REINFORCED SCREEN

For medium-depth and deep wells. Greater collapse strength is achieved with the use of heavy duty Vee-Wire®.

Nominal Diam. in.	ID In. (mm)	OD In. (mm)	Wt. lbs/ft (Kg/m)
4 1/2	4.0 (101)	4.5 (114)	4.5 (6.7)
5	4.5 (114)	5.0 (127)	5.0 (7.4)
5 1/2	5.0 (127)	5.5 (140)	6.0 (9.0)
6 5/8	6.1 (156)	6.6 (168)	7.3 (10.9)
7	6.5 (164)	7.0 (178)	7.9 (11.7)
7 5/8	7.0 (177)	7.6 (194)	8.7 (12.9)
8 5/8	8.1 (205)	8.6 (219)	10.8 (16.1)
9 5/8	9.1 (230)	9.6 (245)	14.2 (21.2)
10 3/4	10.1 (256)	10.8 (273)	15.8 (23.5)
12	12.0 (305)	12.8 (324)	23.2 (34.6)
14	13.2 (336)	14.0 (356)	25.3 (37.6)
16	15.2 (387)	16.0 (406)	28.8 (42.9)
18	17.2 (436)	18.0 (457)	32.0 (47.6)

PIPE-BASED SCREEN

For deep wells. Very high strength as screen is supported by a perforated pipe.

Nominal Diam. In.	ID In. (mm)	Wall Thkss In. (mm)	OD In. (mm)	Wt. lbs/ft (Kg/m)
4 1/2	4.5 (114)	0.25 (6.4)	5.1 (129)	14.1 (21)
5 1/2	5.5 (140)	0.25 (6.4)	(6.1) 154	17.5 (26)
6 5/8	6.6 (168)	0.29 (7.3)	7.2 (182)	23.5 (35)
8 5/8	8.6 (219)	0.35 (8.9)	9.2 (233)	34.3 (51)
9 5/8	9.6 (245)	0.35 (8.9)	10.2 (259)	37.6 (56)
10 3/4	10.8 (273)	0.40 (10.2)	11.3 (287)	46.4 (69)
13 3/8	13.4 (340)	0.48 (12.2)	13.9 (353)	61.8 (92)

PVC SCREENS

Polyvinyl Chloride (PVC) offers a combination of economy lightweight and design flexibility that makes it a cost-effective solution for;

- Water wells
- Water monitoring wells
- Soil vapor extraction
- Sparging - air or oxygen
- Bioremediation
- Free product recovery
- Groundwater extraction
- Drainage and dewatering
- Leachate collection
- De-gassing

PVC is also used when sampling for heavy metals, since it will not leach metals and contaminate the samples. It also has an advantage over steel when encountering corrosive fluids.

PVC screens fulfill a specific role in the market, thanks to the following properties:

- Resistance to chemical attack and to corrosion
- High-open-area screens (greater than any other type of PVC screen), which means that through-slot velocities are low, reducing turbidity.
- Good mechanical properties due to the wires being ultrasonically welded to the support rods.
- More cost effective than stainless-steel alternatives, as PVC screens and casings are ideal for use in shallow wells .
- Long lasting and more corrosion resistant.
- Lightweight providing easy installation
- Smooth surface, minimizing encrustation.
- Installation is stable for long periods

SLOTTED PVC SCREEN

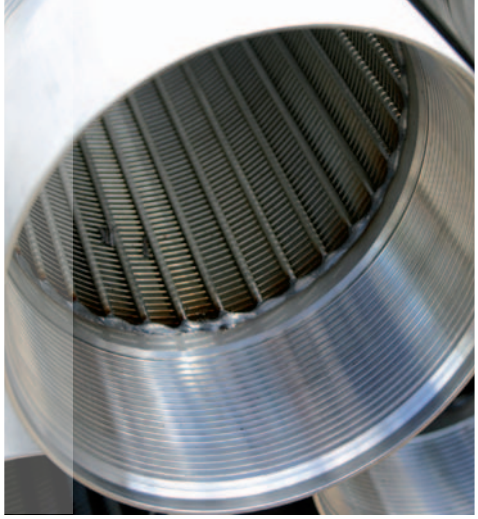
In addition to its continuous slot-type screens, Johnson offers another complete range of slotted PVC screens and casing.

STANDARDS

Slotted PVC screens and casing are manufactured from ASTM D1784 and D1785 pipes. ASTM - F480 and NTP threads available.

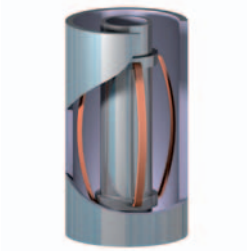
COLLAPSE STRENGTH

The choice of screen depends on the depth at which it will be installed, the well diameter, the weight of gravel pack and the type of drilling mud used.



END FITTING OPTIONS

Most well screen installations involve a few standard fitting combinations. Telescope size screens, for example, typically use a Figure K packer on the screen top and a welded or threaded plate bottom. The plate usually has a welded bail attached to use when lowering the screen. Pipe size screens attach directly to the casing and usually have plate bottoms. A variety of other fittings such as centralizers, shale traps, washdown fittings and connecting fittings are stocked for quick delivery.



Centralizer

Figure TF Washdown

Shale Trap

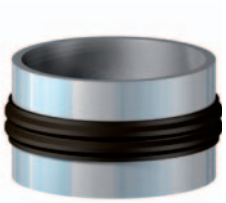
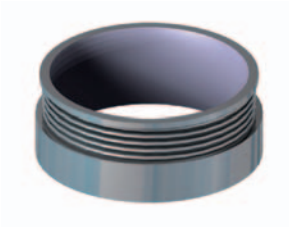
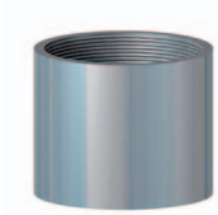


Figure K Packer



Wirelock Fittings

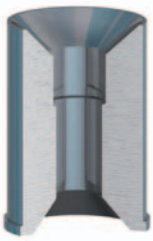
Drive Point



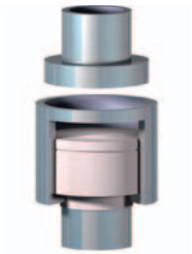
R & L Threaded Couplings

R & L Threaded Nipples

Back Pressure Valves



Wash Plugs



Di-Electric Coupling

Flush Thread

FITTINGS

The physical parameters of depth and diameter along with pump pressure and quality of the water are the main factors determining the choice of riser (drop) pipe and the type of connecting fitting. This choice is vital as the site's productivity, longevity and sustainability depend on it.

Each connecting fitting has its advantages and specific features. Johnson Screens® TUBEXOR® and ZSM (as in photo above) connecting fittings enable:

- Installations in small diameter wells
- Quick and easy assembly and disassembly, providing significant savings in labor and associated hoisting equipment

These two types of connecting fittings make it possible to reduce significantly the problems linked to using Gas or API type threaded stainless steel pipes. Disassembly is made easier due to the slightly tapered profile of the *TUBEXOR* and the provision of a non-stick surface treatment.

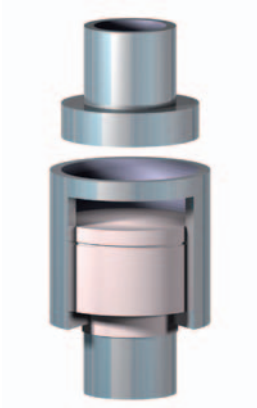
DI-ELECTRIC COUPLING

Johnson Screens di-electric coupling prevents galvanic corrosion in municipal and industrial water well completions. When two dissimilar metals are coupled in water-saturated environments, the less corrosion-resistant metal corrodes faster from the galvanic cell created. This corrosion can be prevented by eliminating the contact between the two metal surfaces.

The di-electric coupling uses insulating rings which separate the metals and prevent contact. This feature increases the life of the pipe and, ultimately, the life of the well. Di-electric couplings are available for pipe sizes from 38 to 609 mm (1½ to 24 inches). Special sizes or connection adaptors are available on request.

FEATURES, ADVANTAGES AND BENEFITS:

- In the center of the coupling, an insulating sleeve prevents dissimilar metals from making contact and causing corrosion of casing. This feature greatly extends the life of the pipe for significant long-term savings.
- The coupling has a small OD, only 38 to 51 mm (1½ to 2 inches) larger than that of the pipe. This feature saves costs by minimising the size of the hole to be drilled.
- The nominal ID of the string is maintained through the coupling for full design functionality.



NU-WELL®

The performance of any equipment in contact with water is affected by algal growth, build-up of scale and encrustation. Various methods of cleaning are utilized, including scraping, agitating or treatment with chemicals.

Sometimes shock-chlorination or explosives have been used to clean water wells. The effects of these methods range from limited to damaging or even dangerous.

Johnson Screens® *Nu-Well* products offer a range of cleaning chemicals that are suitable for most applications and do not damage vital equipment.

Some of these chemicals are available in granular form and have been classified as non-hazardous. Therefore, no special transport precautions are needed.

These chemicals have been approved for use in potable-water applications and on equipment utilized for the preparation of food.

REVERT™ II BIODEGRADABLE DRILLING MUD

Revert II is a natural polymer-based powder that, when added to water, makes a biodegradable drilling mud. Years of experience and research have enabled us to make a product that is simple to prepare and has viscosity that is easy to control. It can be used in rotary, percussion or core drilling. *Revert II* offers many advantages over clay-based alternatives.

ADVANTAGES

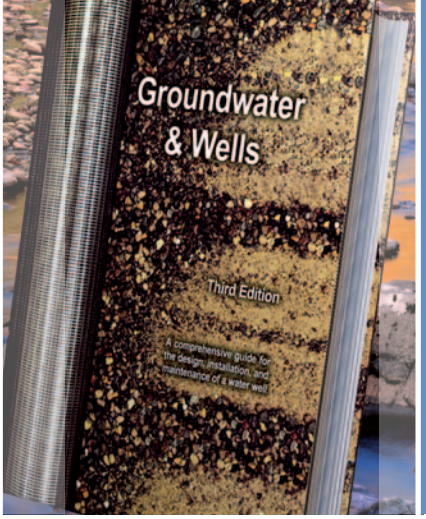
- Minimal damage to formation
- Faster well development
- High rate of viscosity increase after mixing
- Better formation samples
- Can be mixed with fresh or salt water

CLEARWELL™

The *ClearWELL* device is a patented electronic, physical water-treating device that keeps wells producing at peak efficiency by dramatically reducing deposition of scale on the surface of screens and tubing and over time, removing pre-existing carbonate scales. The device is attached at the surface, not downhole.

How does the *ClearWELL* device control scale deposition?

The device works by inducing a random, varying electromagnetic field throughout the complete production conduit system. The rapidly changing field causes homogeneous scale crystal formation in produced fluids, deterring scale deposition on the interior walls of the screen and tubing. The scale is then carried away with the produced fluids.



GROUNDWATER AND WELLS

Recognized worldwide by engineers and scientists as the authoritative text on hydro-geology, well hydraulics, design, construction and materials.

We recognize the growing importance of environmental engineering.

Groundwater and Well's third edition includes comprehensive coverage of the accepted practices in environmental well management.

This book is a valuable tool for anyone who designs, specifies, drills, samples, manages, or interprets data from monitoring or recovery wells while complying with federal state and local laws. Groundwater and Wells can be purchased from the Johnson Screens® web site.

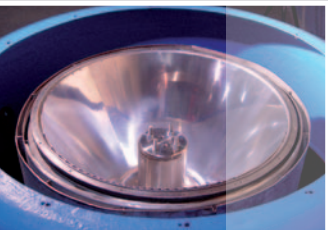
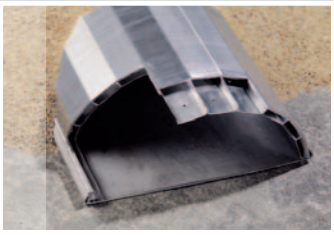
CHEMICAL CLEANING, DISINFECTION AND DECONTAMINATION OF WATER WELLS

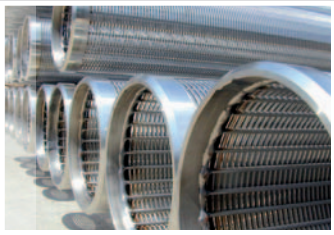
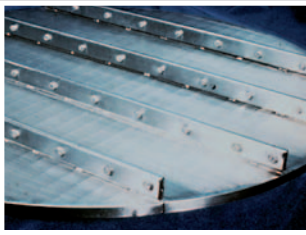
The Chemical Cleaning, Disinfection and Decontamination of Water Wells is a compact but complete assessment of the important place certain chemicals have in modern water treatment and water system construction and maintenance programs.

Included in this text are complete descriptions of nearly every chemical frequently used in water supply applications. The focus is on effective, efficient use of these chemicals to achieve better well rehabilitation, water system cleaning and water quality treatment. Diagrams, formulas, mix ratios and other technical data are included. Also included is a discussion of the proper handling techniques for each chemical and where appropriate, clear warnings about possible hazards and the conditions that can cause them. This book can be purchased from the *Johnson Screens* web site.

Providing over 100 years of experience, innovation and customer satisfaction.

Contact us today.

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